

CLAIMS

1. A greenhouse lamp comprising:
at least one PCB,
at least one LED mounted on said at least one PCB;
5 a carrier having a heat sink, said at least one PCB attached to said carrier;
a clamp adapted for mounting said lamp; and
a power supply.
2. The greenhouse lamp of claim 1 where the clamp is adapted for mounting
10 said lamp to a greenhouse frame.
3. The greenhouse lamp of claim 2 where the width of the carrier is less than
5 cm.
- 15 4. The greenhouse lamp of claim 1 wherein the carrier is about 4.5 cm wide
and about 240 cm long and the PCB is about 3 cm wide and about 60 cm long.
5. The greenhouse lamp of claim 1 further comprising a plurality PCBs each
having at least one LED, wherein the PCBs are attached to the carrier.
- 20 6. The greenhouse lamp of claim 1 wherein carrier comprises a base with a
channel for receiving the PCB.
7. The greenhouse lamp of claim 1 wherein the PCB is a metal core PCB strip
25 and a plurality of power package LEDs are mounted on the PCB strip.
8. The greenhouse lamp of claim 6 wherein the PCB is a metal core PCB strip
and the PCB strip is slidably mounted in the channel.

9. The greenhouse lamp of claim 1 wherein the powers supply is remote from the carrier.

10. The greenhouse lamp of claim 8 further comprises a shim, said shim
5 adapted to secure the PCB strip in the channel.

11. The greenhouse lamp of claim 10 wherein the shim is a collar surrounding one LED.

10 12. The greenhouse lamp of claim 7 further comprising a heat sink.

13. The greenhouse lamp of claim 1 wherein at least one of the LEDs has a peak emission at a desired wavelength.

15 14. The greenhouse lamp of claim 13 wherein the desired wavelength is about 435 nm.

15. The greenhouse lamp of claim 13 wherein the desired wavelength is about 455 nm.

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16. The greenhouse lamp of claim 13 wherein the desire wavelength is about 470 nm.

17. A plant growth lamp comprising:

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at least one PCB;

at least one LED mounted on said at least one PCB; said at least one LED having a desired wavelength;

a carrier having a heat sink, said at least one PCB attached to said carrier;

a clamp adapted for mounting said lamp; and

a power supply.

18. The plant growth lamp of claim 17 wherein at least one of the LEDs has a peak emission at a desired wavelength.

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19. The plant growth lamp of claim 18 wherein the desired wavelength is about 435 nm.

20. The plant growth lamp of claim 18 wherein the desired wavelength is about 455 nm.

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21. The plant growth lamp of claim 18 wherein the desired wavelength is about 470 nm.

22. The plant growth lamp of claim 17 where the clamp is adapted for mounting said lamp to a greenhouse frame.

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23. The plant growth lamp of claim 22 where the width of the carrier is less than 150% the width of the greenhouse frame.

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24. The plant growth lamp of claim 17 wherein the carrier is about 4.5 cm wide and about 240 cm long and the PCB is about 3 cm wide and about 60 cm long.

25. The greenhouse lamp of claim 17 further comprising a plurality PCBs each having at least one LED, wherein the PCBs are attached to the carrier.

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26. The greenhouse lamp of claim 17 wherein carrier comprises a base with a channel for receiving the PCB.

27. The greenhouse lamp of claim 17 wherein the PCB is a metal core PCB strip, a plurality of power package LEDs are mounted on the PCB strip and said LEDs are equally spaced along the PCB strip.

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28. The greenhouse lamp of claim 26 wherein the PCB is a metal core PCB strip and the PCB strip is slidably mounted in the channel.

29. The greenhouse lamp of claim 17 wherein the powers supply is remote
10 from the carrier.

30. The greenhouse lamp of claim 28 further comprises a shim, said shim adapted to secure the PCB strip in the channel.

15 31. The greenhouse lamp of claim 30 wherein the shim is a collar surrounding one LED.

32. The greenhouse lamp of claim 27 further comprising a heat sink.

20 33. A greenhouse lighting assembly comprising:
at least one carrier;
at least one light engine comprising a plurality of LEDs;
said at least one light engine attached to said at least one carrier.

25 34. The lighting assembly of claim 33 where the at least one carrier is adapted to be attached to a greenhouse frame.

35. The lighting assembly of claim 34 where the width of the at least one carrier is about 150% the width of the greenhouse frame.

36. The lighting assembly of claim 34 wherein the width of the at least one support rail is about equal the width of the greenhouse frame.

5 37. The lighting assembly of claim 34 wherein the width of the at least one carrier is narrower than the width of the greenhouse frame.

38. The lighting assembly of claim 33 wherein the at least one carrier is about 4.5 cm wide and about 240 cm long.

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39. The lighting assembly of claim 33 wherein the light engine is about 3 cm wide and about 60 cm long.

40. The lighting assembly of claim 33 further comprising a plurality of light
15 engines, wherein more than one light engine is attached to the at least one carrier.

41. The lighting assembly of claim 33 wherein the at least one carrier
comprises a base with a channel for receiving the at least one light engine; the
20 light engine comprises a metal core PCB strip and a plurality of LEDs are mounted on the PCB strip, and the PCB strip is slidably mounted in the channel.

42. The lighting assembly of claim 41 further comprising a power supply.

25 43. The lighting assembly of claim 33 further comprising a clamp adapted for mounting the carrier to the greenhouse frame.

44. The lighting assembly of claim 41 wherein the light engine further comprises a shim, said shim adapted to secure the PCB strip in the channel.

45. The lighting assembly of claim 44 wherein the shim is a collar surrounding one LED.

5 46. The lighting assembly of claim 33 wherein the light engine further comprises a heat sink.

47. The lighting assembly of claim 43 wherein the lighting assembly is attached to a greenhouse frame.

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48. The lighting assembly of claim 47 wherein the assembly further comprises a plurality of parallel rows, each row comprises at least one carrier.

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49. The lighting assembly of claim 48 wherein each row is substantially the same length as the length of a lighted area of the greenhouse and the rows are arranged to provide substantially uniform even lighting.

50. The lighting assembly of claim 48 wherein the lighting assembly does not substantially reduce the amount of natural light received into the green house.

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51. The lighting assembly of claim 48 wherein the assembly covers less than 15% of the lighted area of the greenhouse.

52. The lighting assembly of claim 51 wherein the assembly covers less than
25 10% of the lighted area of the greenhouse.

53. The lighting assembly of claim 52 wherein the assembly covers less than 5% of the lighted area of the greenhouse.

54. The lighting assembly of claim 53 wherein the assembly covers less than 3% of the lighted area of the greenhouse.